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(71) Applicant (for all designated States except US): WASHINGTON STATE UNIVERSITY RESEARCH FOUNDATION [US/US]; 1610 NE Eastgate Blvd., Pullman, WA 99163 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): CROTEAU, Rodney, B. [US/US]; 1835 NE Valley Road, Pullman, WA 99163 (US). JENNEWEIN, Stefan [DE/DE]; Hauptstrasse 33, 73553 Alfdorf (DE). LONG, Robert [US/US]; 923 South Jefferson Street, Moscow, ID 83843 (US).

(74) Agent: GORDON, Debra, A.; Klarquist Sparkman, LLP, One World Trade Center, Suite 1600, 121 SW Salmon Street, Portland, OR 97204 (US).

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(54) Title: P450 OXYGENASES AND METHODS OF USE

(57) Abstract: This disclosure provides the nucleic acid and protein sequences of novel P450 oxygenases that utilize, at least, taxoid substrates including taxadiene isomers. The disclosed oxygenases, such as a taxoid 5 $\alpha$ -hydroxylase, hydroxylate, at least, the C5 position of a taxoid. Also provided are methods of introducing oxygen at the C5 position of a taxoid and methods of producing the anti-cancer drug, paclitaxel (also known as Taxol<sup>TM</sup>), and other taxoids, such as paclitaxel intermediates.

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